Section 5: Communications

This Section describes the Ethernet and Serial communications features of the PACSystems CPU.

Ethernet communications may be handled by the embedded CPU Ethernet port(s) or by an IC695ETM001 module installed in an RX3i rack. Refer to *PACSystems RX3i TCP/IP Ethernet Communications User Manual,* GFK-2224.

Serial communications may be handled by the embedded CPU Serial port(s) or by an IC695CMM002 or IC695CMM004 module installed in an RX3i rack. Refer to *PACSystems RX3i Serial Communications Modules User's Manual,* GFK-2460.

This Section contains the following information with respect to the embedded CPU ports:

- Ethernet Communications
- Serial Communications

5.1 Ethernet Communications

For details on Ethernet communications for PACSystems, please refer to the following manuals:

PACSystems RX3i and RSTi-EP TCP/IP Ethernet Communications User Manual, GFK-2224
PACSystems TCP/IP Ethernet Communications Station Manager User Manual, GFK-2225.

5.1.1 Embedded Ethernet Interfaces

5.1.1.1 RX3i

RX3i CPE302, CPE305, CPE310, CPE330, CPE400 and CPL410 CPUs provide one or more embedded Ethernet interfaces. If used, each interface connects to a Local Area Network (LAN).

The corresponding RJ45 Ethernet port(s) automatically sense the data rate on the attached LAN (1 Gbps, 100 Mbps or 10 Mbps), as well as the corresponding communication mode (half-duplex or full-duplex), and the corresponding cabling arrangement (straight through or crossover). Automatic detection greatly simplifies installation procedures.

See RX3i CPU Features and Specifications to determine the complete list of Internet protocols supported by each CPU.

Some important protocols supported by all RX3i CPUs are:

- TCP/IP, which provides basic Internet capabilities;
- SRTP, which is proprietary and which provides the interface with the PME programming and configuration software and supports communications with certain control systems and supervisory computer layers in the factory;
- Modbus/TCP, which supports the Modbus messaging structure over the Internet.

On the CPE302/CPE305/CPE310 models, the same shared processor performs both Ethernet port processing and Controller logic processing.

On the CPE330, the dual core CPU enables communication to be handled by one core while CPU logic and I/O scanning is handled by the second core. Furthermore, each LAN interface is controlled by a dedicated Network Interface Controller (NIC). In the CPE400 and CPL410, one of the four microprocessor cores is dedicated to handling the communications function (LAN1, LAN2 and LAN3).

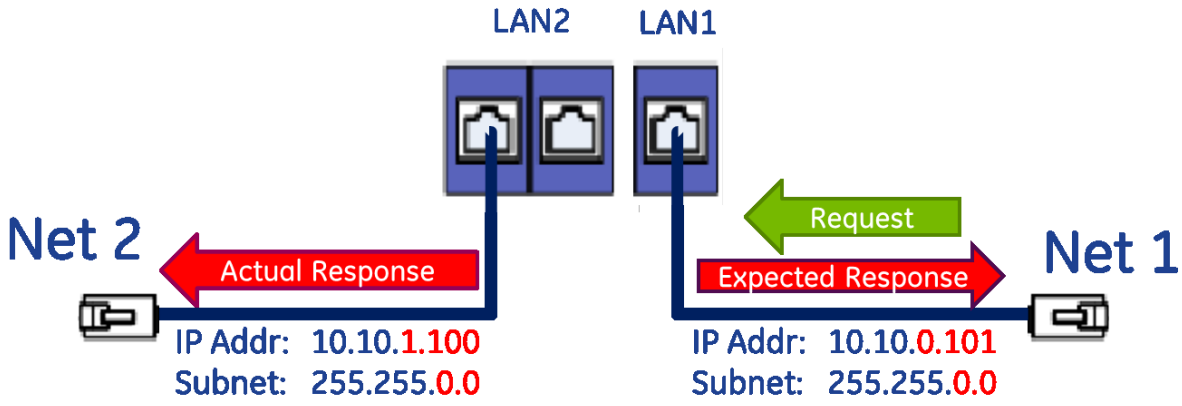
As a result of the hardware advances in the CPE330, CPE400 and CPL410, a higher level of processing power is provided in support of each LAN. This is especially important at higher data rates. It also offloads the handling of Ethernet-level activity from the processor core tasked with performing CPU logic and I/O scanning, permitting that core to run more efficiently.

Each interface on a LAN must have a unique IP Address *and* a non-overlapping IP subnet. This is configured in PME. Care must be taken to survey the entire connected network architecture in order to tabulate the IP addresses and IP subnets already in use, both on the local networks and on any of its routed subnets connected with a gateway. Never assign a conflicting IP Address or configure duplicate IP subnets.

The following examples would be problematic:

5.1.1.1.1 Problem example #1:

Figure 45: CPE330 Overlapping Local IP Subnet Example



The issue demonstrated in Figure 45 is that requests entering one CPE330 interface can be routed out the other interface since both CPE330 Ethernet ports have been configured to be on the same network (255.255.0.0) but are physically connected to separate networks. Avoid this by assigning non-overlapping Subnets.

5.1.1.1.2 Problem example #2:

A user wishes to communicate through a routed network to an RX3i CPU with multiple network interfaces (CPE330, in this example). This remote IP device is configured with the following IP parameters:

IP	192.168.0.5
Subnet Mask	255.255.255.0
Gateway	192.168.0.250

LAN1 and LAN2 on the CPE330 are initially configured with following problematic IP para meters: